

FORM PTO-1390
(REV. 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER
P/62959-PCT

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO (if known, see 37 CFR 1.5)
10/049176

INTERNATIONAL APPLICATION NO.
PCT/IB00/01221

INTERNATIONAL FILING DATE
August 10, 2000

PRIORITY DATE CLAIMED
August 12, 1999

TITLE OF INVENTION **BROADBAND POLARIZATION FILTER**

APPLICANT(S) FOR DO/EO/US **Uwe ROSENBERG; Werner SPELDRICH**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371 (f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☐ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A **FIRST** preliminary amendment.
14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information: **Receipt Acknowledgment Postcard**

U.S. APPLICATION NO (if known, see 37 CFR 1.5) <div style="font-size: 1.5em; font-weight: bold;">10/049176</div>		INTERNATIONAL APPLICATION NO PCT/IB00/01221		ATTORNEY'S DOCKET NUMBER P/62959-PCT	
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21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1,040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 <div style="text-align: right;">ENTER APPROPRIATE BASIC FEE AMOUNT =</div>				CALCULATIONS PTO USE ONLY <div style="border: 1px solid black; padding: 2px;">\$890.00</div>	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				<div style="border: 1px solid black; padding: 2px;">\$0.00</div>	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total claims	9 - 20 =	0	x \$18.00	\$0.00	
Independent claims	1 - 3 =	0	x \$84.00	\$0.00	
				+ \$280.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				\$280.00	
TOTAL OF ABOVE CALCULATIONS =				\$1,170.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				<div style="border: 1px solid black; padding: 2px;">\$0.00</div>	
SUBTOTAL =				\$1,170.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				<div style="border: 1px solid black; padding: 2px;">\$0.00</div>	
TOTAL NATIONAL FEE =				\$1,170.00	
Fee for recording the enclosed assignment (37 CFR 1.21 (h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				<div style="border: 1px solid black; padding: 2px;">\$0.00</div>	
TOTAL FEES ENCLOSED =				\$1,170.00	
				Amount to be refunded:	\$
				charged:	\$

a. ☒ A check in the amount of **\$1,170.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 11-1145. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

KIRSCHSTEIN, OTTINGER, ISRAEL & SCHIFFMILLER, P.C.
 489 Fifth Avenue
 New York, New York 10017
 (212) 697-3750

SIGNATURE:

Alan Israel
 NAME
27,564
 REGISTRATION NUMBER

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as Express Mail No. EL 337 912 074 US in an envelope addressed to: Box: PCT, Commissioner of Patents and Trademarks, Washington, D.C., 20231, on: February 7, 2002
 (date) a Alan Israel Reg. No. 27,564

10/049176
Rec'd PCT/PTO 10 JUN 2002

Docket No.: P/62959

PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

I hereby certify that this correspondence is being deposited with the U S Postal Service as Express Mail No. EL 337 912 627 US in an envelope addressed to: Box. PCT, Commissioner of Patents and Trademarks, Washington, D C., 20231, on June 10, 2002
(date)
Alan Israel
Reg No 27,564

International Application No.: PCT/IB00/01221
International Filing Date : August 10, 2000
In re: Application of : Uwe ROSENBERG, et al.
Serial No. : 10/049,176
Deposited : February 7, 2002
For : BROADBAND POLARIZATION FILTER

New York, New York
June 10, 2002

PRELIMINARY AMENDMENT

BOX: PCT
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

Prior to calculation of the filing fee and before examination, kindly amend the above captioned application as follows:

IN THE CLAIMS:

Please cancel claims 1-6, without prejudice.

Please add the new set of claims 7-12 set forth on the enclosed pages.

IN THE ABSTRACT:

Delete the "Abstract" on the PCT cover sheet and replace it with the "Abstract of the Disclosure" set forth on a separate sheet attached hereto.

REMARKS

An abstract has been provided on a separate sheet; and the claims have been amended to conform to U.S. practice.

Accompanying this communication is a literal English translation of the above identified application, and the fee of \$130.00 as set forth under 37 C.F.R. §1.492(f). The undersigned attorney asks that the English translation be used as the copy for examination purposes as required under 37 C.F.R. §1.52.

If there are any additional charges, or any overpayment, in connection with the filing of this Communication, the Commissioner is hereby authorized to charge any such deficiency, or credit any such overpayment, to Deposit Account No. 11-1145.

Wherefore, an early action on the merits is earnestly solicited.

Respectfully submitted,

KIRSCHSTEIN, OTTINGER, ISRAEL & SCHIFFMILLER, P.C.

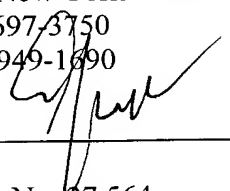
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ABSTRACT OF THE DISCLOSURE

A polarization filter for a high frequency wave guided in a waveguide has an entry section in which wave types that are orthogonally polarized in relation to one another are capable of propagating. The filter also comprises two first exit sections which extend along the length of the entry section, which are separated by a septum, and which are provided for a first wave type. In addition, the filter has two second exit sections which laterally extend in the plane of the septum, which are provided for the second wave type, and which are configured as coaxial conductors.

NEW CLAIMS

7. A polarization filter for high frequency waves guided in a waveguide, comprising:

- a) an entry section in which two orthogonally polarized wave types are capable of propagating,
- b) two first exit sections for propagating one of the wave types and extending along an extension of the entry section,
- c) a planar septum for separating the two first exit sections, and
- d) two second exit sections for propagating the other of the wave types and extending laterally in a plane of the septum, the two second exit sections being coaxial conductors.

8. The polarization filter according to claim 7, wherein the septum has a tapering front section, and wherein the second exit sections lead into the entry section between a tip and a base of the front section.

9. The polarization filter according to claim 7, wherein the entry section has walls with inward protruding ridges oriented along a longitudinal direction.

10. The polarization filter according to claim 9, wherein the ridges on the walls of the entry section, to which the second exit sections do not lead, are lengthened into the first exit sections.

11. The polarization filter according to claim 9, and comprising a step formed at a transition between the entry section and the first exit sections, and wherein the ridges extend from the step only over a part of a length of the entry section.

12. The polarization filter according to claim 7, wherein the coaxial conductors each has an internal conductor that carries a bead on an end protruding into the entry section.

Broadband Polarization Separator

The present invention concerns a polarization separator for separation/combination of orthogonally polarized high-frequency waves, guided in a waveguide, which is usable for extremely large bandwidth.

Different variants are known for combination and separation of orthogonally polarized signals. A review of designs of such polarization separators or combiners is offered in "Waveguide Components for Antenna Feed Systems: Theory and CAD", Artech House, 1993, pages 377 ff.

Since polarization separators and combiners do not differ in design, but only in the direction in which they are traversed by the electromagnetic wave, the term "polarization separator" is used below for both.

Simple designs are obtained, if only the fundamental wave types H₁₀ and H₀₁ are capable of propagation in the common connection waveguide, on which the polarization separator is mounted. This constraint limits the useful frequency band of such variants to about 25%.

Polarization separators with a bandwidth of more than 30% require more demanding designs, in which coupling of higher wave types, capable of propagation in the connection wave guide, is suppressed, because of the symmetry in the branching region of the separator. On page 397 of the aforementioned literature source, a polarization separator with such a symmetric layout is depicted, which has an input section, in which orthogonally polarized wave types are capable of propagating, two first output sections separated by a septum and extending in an extension of the input section for a first of the wave types, and two second output sections extending sideward in the plane of the septum for the second wave type. This design corresponds to a five-gate waveguide branch with two symmetric waveguide pairs that correspond to the first and second output sections, in which the fundamental wave type of each of these output sections couples half of the signal energy of the corresponding polarization of the input section. The first and second output sections are decoupled from each other. The first and second output sections can be combined by appropriate means, like branches, a magic T, etc., so that the two orthogonal polarizations can each be tapped at a terminal or fed into a connection wave guide, when the polarization separator is used to combine two orthogonal polarizations.

The maximum attainable useful bandwidth in this known polarization separator is limited to about 50%. The reason for this is that the wave types within the paired symmetric connection section, whose electromagnetic fields are oriented orthogonal to the corresponding fundamental wave type, are capable of propagation when the frequency of the wave exceeds twice the limiting frequency of the corresponding connection section. If, however, the connection waveguide is capable of transmitting the orthogonal polarization, this principle is no longer applicable, since the short circuit planes required for the wave types are no longer present in the branching zone.

A polarization separator that has ridges on the inside surface of its input section and on four connection sections extending in an extension of the inside wall is known from GB 2 175 145.

The design of this polarization separator is demanding and the fact that all four output sections have the same orientation parallel to the axis of the input section makes the use of complicated connection conductors, oscillated in several planes, essential, in order to combine the orthogonal polarization component occurring at the two output sections.

Advantages of the Invention

With the present invention a polarization separator is devised, with which the orthogonal wave types of a common waveguide connected to an input section of the polarization separator can be coupled independently in a very broad frequency band. The width of the frequency band can be 56% and more.

This advantage is achieved in a polarization separator with an input section in which orthogonally polarized wave types are capable of propagating, and two first output sections separated by a septum and extending in an extension of the input section for a first wave type, and two second output sections extending sideward in a plane of the septum for the second wave type, by the fact that the second output sections are designed as coaxial conductors. The septum means that, of the two orthogonally polarized wave types H10, H01 that are capable of propagation in the input section, the one with an E field parallel to the orientation of the septum is reflected. A short circuit plane is therefore formed for this wave type, so that coaxial conductor coupling is carried out at the corresponding field strength maximum in front of the septum. In order to achieve coupling of the wave types with an E field perpendicular to the septum to the first output sections with the lowest possible reflection, it is expedient for the septum to have a front section that tapers into the input section. The second output sections then lead into the input section appropriately between the tip and base of the front section.

In order to increase the uniqueness range of the polarization separator, it is expedient to provide its input section on its walls with inward protruding ridges oriented in the longitudinal direction.

These ridges are expediently lengthened into the first output section on those walls of the input section to which the second output section does not lead, in order to also increase its uniqueness range.

A waveguide provided with such ridges has a lower limiting frequency than a waveguide without the ridges with the corresponding dimensions. The uniqueness range of the waveguide with ridges is therefore greater.

If the input section has no ridges, but the first output sections are designed with ridges because of the large bandwidth, it is expedient to provide a step at the transition between the input section and the first output sections, in which the ridges extend from the step only over part of the length of the input section. The cross section can then be expediently dimensioned, so that the limiting frequencies of the ridgeless part of the input section and the first output sections are the same.

Additional features and advantages of the invention are apparent from the following description of practical examples with reference to the figures.

Figures

Figures 1 to 3 show perspective views of different embodiments of polarization separators according to the invention.

Description of the practical examples

Figure 1 shows a polarization separator 1 according to a first embodiment of the invention. The polarization separator has a cuboid body with an input section 2 with a square cross section, in which wave types H10 and H01 are capable of propagation, and two first output sections 3, 3' connected to it, which are separated by a partition or septum 4, which may consist of the same conducting material as the walls of the polarization separator. In the first output sections 3, 3', only the wave type H10 is capable of propagation. The cross sections of the two first output sections are identical, so that the energy of an H10 wave entering the input section 2 is divided in equal parts in these two output sections 3, 3'. The H01 wave type, on the other hand, is reflected on septum 4.

In order to keep reflection as low as possible during coupling of the H10 wave type to the first output sections 3, 3', the septum 4 is provided with a front section 5 that tapers to a point in the input section 2. Two output sections 6 in the form of coaxial conductors are arranged on walls of the polarization separator connected by the septum and extend symmetrically perpendicular to the longitudinal direction of the polarization separator, i.e., to the x direction of the coordinate system shown in the figure. The region of the septum in contact with the side wall causes a short circuit for the H01 wave type. The occurring electric field strength maximum that is coupled by the coaxial conductor 6 lies in the region of the septum tip 19. By appropriate shaping of the tip, the coupling function can be optimized for the wide frequency range.

The coaxial conductors 6 couple capacitively to the input section 2 by means of ends of their inner conductor 7 protruding into the interior of the input section 2. These ends do not reach the front section 5 of the septum. To improve their coupling, a bead or thickening 8, made of a conducting material, is provided on the exposed ends of the inner conductor 7. The precise shape of bead 8 is decisive in conjunction with the septum contour for broadband coupling and can be spherical, flat-cylindrical or disk-shape and its diameter is typically much greater than that of the inner conductor, but smaller than that of the entire coaxial conductor.

Relative to the solution known, for example, from GB 2 175 145 A with exclusively branching waveguide gates, this solution has the advantage that the coaxial gates of the second output section 6 have only insignificant reactive effects on the layout of the axial waveguide branch of the first output sections 3, 3'.

Owing to the symmetry of the proposed arrangement, the polarization separator can also be used above the limiting frequency of H20/H02 wave types of the input section or a waveguide connected to it. A prerequisite for this is that no higher wave types are capable of propagation in the first output section, to which the orthogonal wave type H01 of the input section can couple.

A' modification of the polarization separator according to the invention is shown in Figure 2, in

which the input section 2 has ridges 10, 11, 12 13 oriented in the longitudinal direction arranged in all four walls in the center. The ridges 10, 11, which extend from the lower or upper wall into the interior of the polarization separator, continue beyond the intersection 2 into the first output sections 3, 3', defined by the septum 4. These ridges therefore cause an increase in uniqueness range both in input section 2 and in the first output sections. The ridges 12, 13, which extend to the lateral walls of the polarization separator in the plane of septum 4, end in the region of the junction of coaxial conductors 6, 6'. The contours of front section 5 of septum 4 and ridges 12, 13 also permit coupling of coaxial conductors 6, 6' over a very broad frequency range, in which galvanic coupling is shown in this example, i.e., the inner conductors 7 of the coaxial conductor are conductively connected to the front section 5 of septum 4.

Figure 3 shows a practical example, in which the input section 2 is initially designed square and without ridges, the ridges 14, 15 only extending onto the upper and lower ends of the input section roughly at the height of the front section 5 of the septum or the junctions of the coaxial conductors 6, 6' into the input section.

Ridges 16, 17, parallel to ridges 14, 15, are formed on an outer wall of the first output sections 3, 3', extending in a continuation of the input section. Since ridge waveguides have lower cross sectional dimensions than undisturbed rectangular waveguides with the same limiting frequency, the first output sections 3, 3' in the practical example of Figure 3 can be designed with a smaller cross section than in Figure 1, which does not have the ridges. The first output sections 3, 3' and the input section 2 meet at a step 18 that lies at the height of the base 20 of front section 5 of the septum, i.e., where the side edges of the front section reach the walls. The ridge sections 14, 15 extending from the shoulder 18 into the input section 2 serve for gradual coupling, with the least possible reflection, of the H10 wave type of the input section 2 to the first output sections.

As an alternative, several shoulders can also be provided in the transitional region between the input section and the first output section, and they can also extend beyond the connection region of the coaxial conductors 6, 6' in the direction of a square waveguide connected to the input section 2.

The trend of the front section of the septum can be both continuous, as shown in Figures 1 to 3, and also stepped. It is also possible for the septum to have a ridge on its lower and upper side, so that, for example, the first output sections in Figures 2 and 3 would each have a ridge on both broad sides. In this case, it is advantageous to design the ridge in the region of the front section also with dimensions that diminish in the direction of the tip 19 of the front section, for example, with continuously diminishing height, or stepped, in order to achieve branching with the lowest possible reflection.

The first and second output sections can now be very simply connected by appropriate means, so that the signal fractions of each polarization are combined and tapped at a corresponding interface, or can be fed during use of the polarization separator as a combiner.

For the first output sections extending in the actual direction of the polarization separator, this can occur simply by using an E-plane branch or by a folded magic T at the end of the septum. It is advantageous if the narrow sides of the first output sections are reduced in the region of the

septum, in order to achieve a distinct cross section in the region of the branch or magic T and thus rule out an adverse effect from higher wave types.

The coaxial conductors can be combined by a coaxial coupling device. Another possibility is to join the coaxial conductors with appropriate waveguide transitions, so that the signal can be combined via an E-plane branch or a magic T. In contrast to an exclusive solution in waveguide technology according to the prior art, very long waveguide transformers are avoided here for reduction of the cross section, since a correspondingly reduced cross section for the branch can be considered in the coaxial conductor transition. A very compact design is therefore produced for a polarization separator arrangement.

Claims

1. Polarization separator for high-frequency waves guided in a waveguide with an input section (2), in which two orthogonally polarized wave types are capable of propagating, two first output sections (3, 3'), separated by a septum (4) and extending in an extension of the input section (2) for a first wave type, and two second output sections (6, 6'), extending sideward in the plane of the septum (4) for the second wave type, characterized by the fact that the second output sections (6, 6') are designed as coaxial conductors.
2. Polarization separator according to Claim 1, characterized by the fact that the septum (4) has a tapering front section (5), and that the second output sections (6, 6') lead into the input section (2) between the tip (19) and base (20) of the front section (5).
3. Polarization separator according to Claim 1 or 2, characterized by the fact that the input section (2) is provided on its walls with inward protruding ridges (10, 11, 12, 13), oriented in the longitudinal direction.
4. Polarization separator according to Claim 3, characterized by the fact that the ridges on those walls of the input section (2), to which the second output sections (6, 6') do not lead, are lengthened into the first output sections (3, 3').
5. Polarization separator according to Claim 3 or 4, characterized by the fact that a step (18) is formed, at the transition between the input section (2) and the first output sections (3, 3'), and that the ridges (14, 15) extend from step (18) only over part of the length of the input section (2).
6. Polarization separator according to one of the preceding claims, characterized by the fact that the coaxial conductors (6, 6') have an internal conductor (7) that carries a bead (8) on its end protruding into the input section.

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES
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(19) Weltorganisation für geistiges Eigentum
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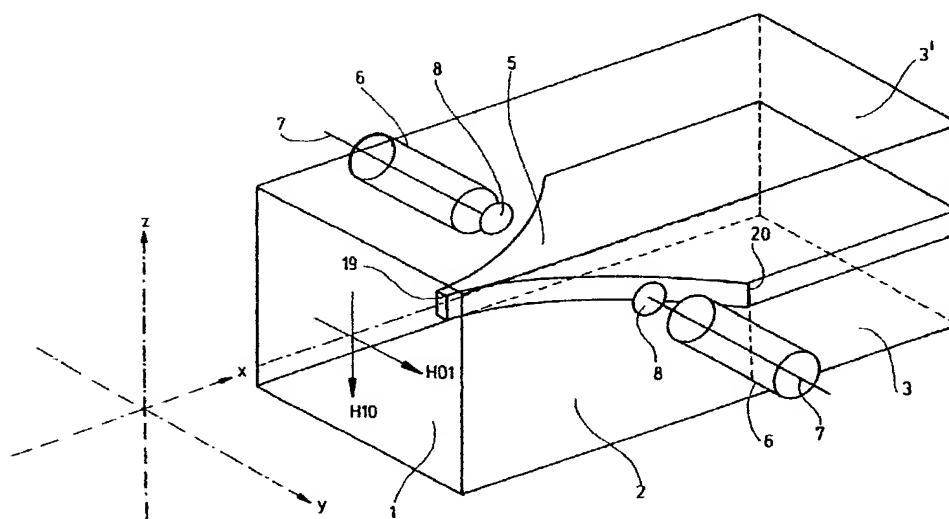
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[Fortsetzung auf der nächsten Seite]

(54) Title: **BROADBAND POLARIZATION FILTER**

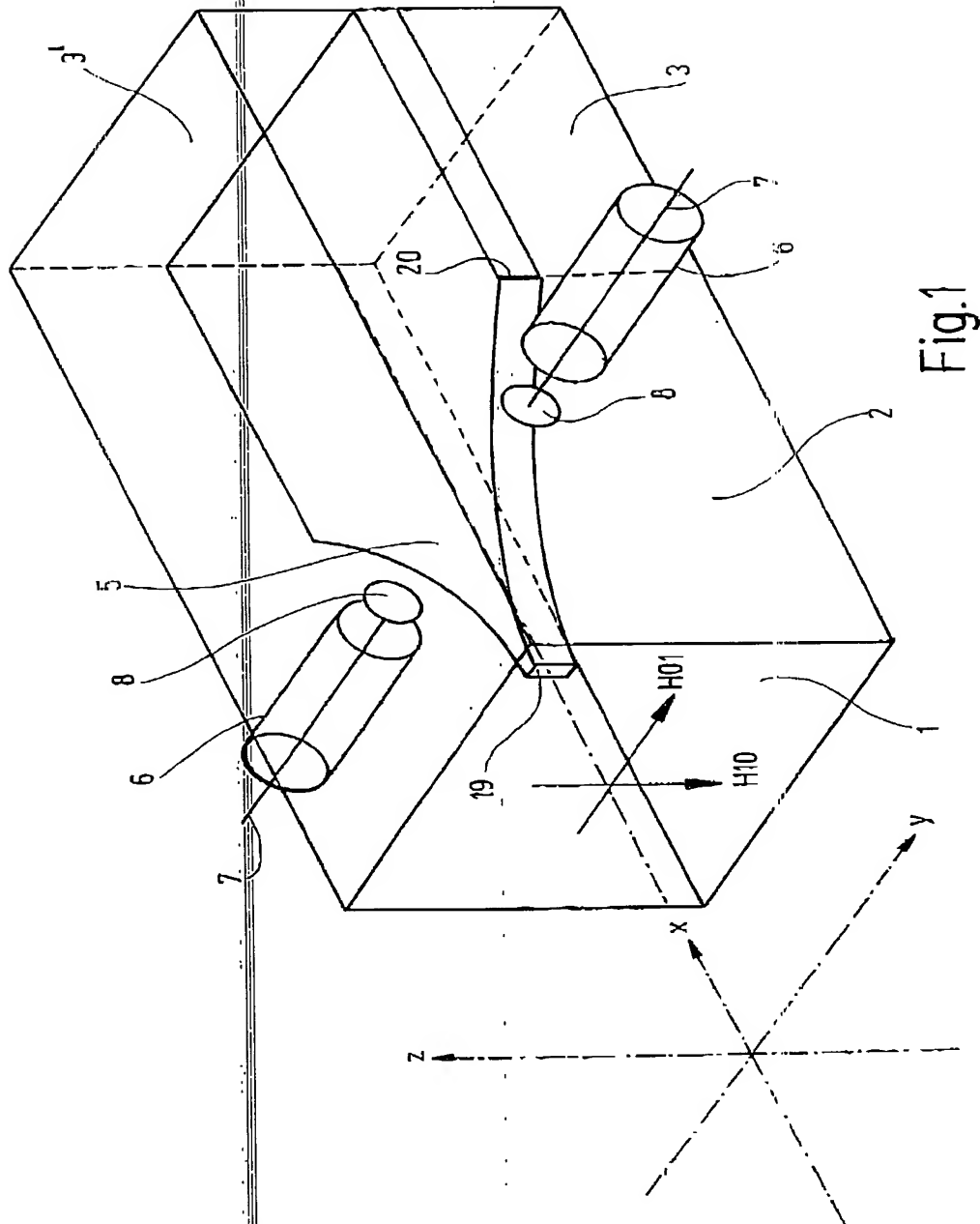
(54) Bezeichnung: **BREITBAND-POLARISATIONSWEICHE**

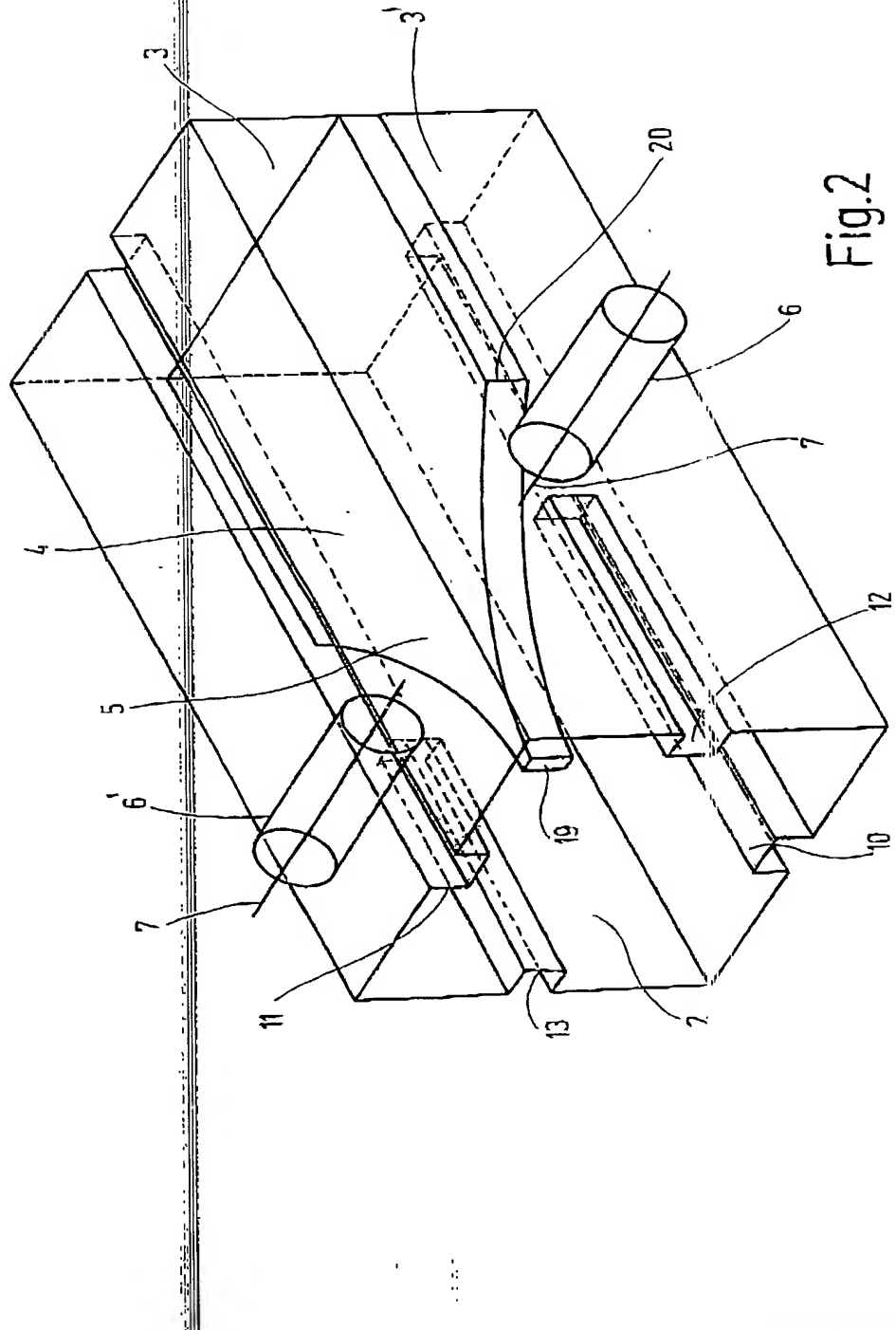


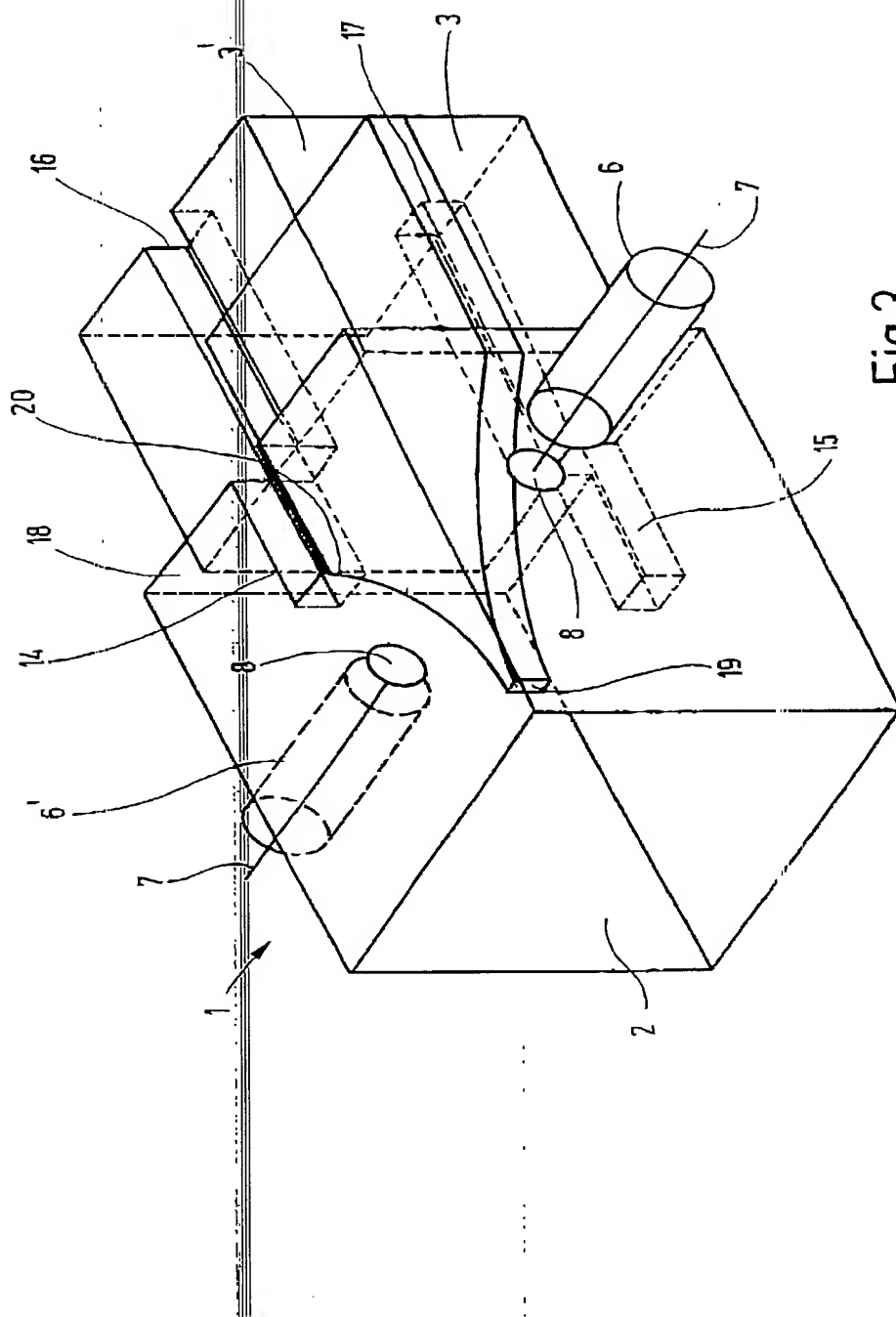
(57) Abstract: The invention relates to a polarization filter for a high frequency wave guided in a wave guide. Said filter comprises an entry section (2) in which wave types that are orthogonally polarized in relation to one another are capable of propagating. The inventive polarization filter also comprises two first exit sections (3, 3') which extend along the length of the entry section (2), which are separated by a septum (4), and which are provided for a first wave type. In addition, the polarization filter has two second exit sections which laterally extend in the plane of the septum (4), which are provided for the second wave type, and which are configured as coaxial conductors (6, 6').

[Fortsetzung auf der nächsten Seite]

WO 01/13458 A1







Type a plus sign (+) inside this box → ☐0010/PTO
Rev. 6/95U.S. Department of Commerce
Patent and Trademark Office**DECLARATION FOR
UTILITY OR DESIGN
PATENT APPLICATION**

☐ Declaration Submitted with Initial Filing OR ☒ Declaration Submitted after Initial Filing

Attorney Docket Number

P/62959

First Named Inventor

ROSENBERG, Uwe

COMPLETE IF KNOWN

Application Number

10/049,176

Filing Date

FEBRUARY 7, 2002

Group Art Unit

Examiner Name

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

BROADBAND POLARIZATION FILTER

(Title of the Invention)

the specification of which

☐ is attached hereto
OR

☒ was filed on (MM/DD/YYYY)

FEBRUARY 7, 2002

as United States Application Number or PCT International

Application Number

10/049,176

and was amended on (MM/DD/YYYY)

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code §119 (a)-(d) or §385(b) of any foreign application(s) for patent or inventor's certificate, or §385 (a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
P.19938204.2	Germany	August 12 1999	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
PCT/1300/61221	INTERNATIONAL	August 10, 2000	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority sheet attached hereto:

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.

Burden Hour Statement: This form is estimated to take 4 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Type a plus sign (+) inside this box → ☐

DECLARATION				Page 2	
I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s), or §365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.					
U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)		
<input type="checkbox"/> Additional U.S. or PCT international application numbers are listed on a supplemental priority sheet attached hereto.					
As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:					
<input type="checkbox"/> Firm Name 				Customer Number or label 	
<input checked="" type="checkbox"/> List attorney(s) and/or agent(s) name and registration number below:					
Name	Registration Number	Name	Registration Number		
David B. Kirschstein, Esq. Alan Israel, Esq. Martin W. Schiffmiller, Esq.	17,244 27,564 30,421	<div style="border: 2px solid black; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 0 auto;">3</div>			
<input type="checkbox"/> Additional attorney(s) and/or agent(s) named on a supplemental sheet attached hereto.					
Please direct all correspondence to: <input type="checkbox"/> Customer Number or label				OR <input checked="" type="checkbox"/> Fill in correspondence address below	
Name <u>KIRSCHSTEIN, OTTINGER, ISRAEL & SCHIFFMILLER, P.C.</u>					
Address <u>489 Fifth Avenue</u>					
City <u>New York</u> State <u>New York</u> ZIP <u>10017-6105</u>					
Country <u>United States</u>		Telephone <u>(212) 697-3750</u>		Fax <u>(212) 949-1690</u>	
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.					
Name of Sole or First Inventor: <u>Uwe Rosenberg</u>				<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name	Uwe	Middle Initial		Family Name	ROSENBERG
Inventor's Signature				Date	4 MARCH 2002
Residence: City	Backnang	State		Country	Germany
Post Office Address <u>Silberpapperlweg 29, D-71522 Backnang, Germany</u>					
Post Office Address					
City	Backnang	State		Zip	D-71522
Country				Germany	
Applicant Authority					
<input checked="" type="checkbox"/> Additional inventors are being named on supplemental sheet(s) attached hereto					

Type a plus sign (+) inside this box → ☐

DECLARATION					ADDITIONAL INVENTOR(S) Supplemental Sheet				
Name of Additional Joint Inventor, if any:					<input type="checkbox"/> A petition has been filed for this unsigned inventor				
Given Name	Werner <i>W</i>	Middle Initial		Family Name	SPELDRICH			Suffix e.g. Jr.	
Inventor's Signature					<i>X W. Speldrich</i>			Date	4 MARCH 2002
Residence: City		Backnang <i>Def</i>		State				Country	Germany
Post Office Address		Suedstrasse 107, D-71522 Backnang, Germany							
Post Office Address									
City	Backnang	State		Zip	D-71522	Country	Germany	Applicant Authority	
Name of Additional Joint Inventor, if any:					<input type="checkbox"/> A petition has been filed for this unsigned inventor				
Given Name		Middle Initial		Family Name				Suffix e.g. Jr.	
Inventor's Signature								Date	
Residence: City				State				Country	
Post Office Address									
Post Office Address									
City		State		Zip		Country		Applicant Authority	
Name of Additional Joint Inventor, if any:					<input type="checkbox"/> A petition has been filed for this unsigned inventor				
Given Name		Middle Initial		Family Name				Suffix e.g. Jr.	
Inventor's Signature								Date	
Residence: City				State				Country	
Post Office Address									
Post Office Address									
City		State		Zip		Country		Applicant Authority	
Name of Additional Joint Inventor, if any:					<input type="checkbox"/> A petition has been filed for this unsigned inventor				
Given Name		Middle Initial		Family Name				Suffix e.g. Jr.	
Inventor's Signature								Date	
Residence: City				State				Country	
Post Office Address									
Post Office Address									
City		State		Zip		Country		Applicant Authority	

☐ Additional inventors are being named on supplemental sheet(s) attached hereto